Pain characterization in patients with Parkinson's disease*

Caracterização da dor em pacientes com doença de Parkinson

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ABSTRACT

BACKGROUND AND OBJECTIVES: Pain in Parkinson's disease is a very frequent complaint and may precede the diagnoses of the disease. This study aimed at evaluating pain in a group of Parkinson's disease patients from a specialized treatment center.
METHODS: This is a observational study of pain in Parkinson's disease patients from the Clinicas Hospital, Federal University of Pernambuco. The convenience sample, obtained between July and August 2011, was made up of 24 individuals, being 17 males and 7 females, aged between 42 and 50 (mean=64.3) years, and 48 and 66 (mean=58.7) years, respectively. Section III of the Unified Parkinson's Disease Rating Scale, Hoehn and Yahr (HY) scale according to the stage of the disease, McGill pain questionnaire and Mini Mental State Examination were used.
RESULTS: Specific body region with most frequent pain was lumbar spine (50%). Categorized regions with highest complaint percentages were: trunk (66.7%) and limbs (37.5% upper; 37.5% lower). Most patients have referred pain in a single body region, regardless of analyzing specific or categorized regions (37.5%). There has been no significant difference in proportional scores obtained by each McGill questionnaire score component. Patients with rigid-akinetic Parkinson's disease had higher number of painful body regions. The comparison among McGill indices, according to predominant symptom and according to Parkinson's disease stage (HY) scores has not shown significant differences.
CONCLUSION: In our study, all Parkinson's disease patients have referred pain. Although pain is one of the most frequent non-motor symptoms, many aspects regarding Parkinson's disease-related pain need further investigation, such as which would be the best pain categorization and which methodology could better distinguish different mechanisms of different types of pain.
Keywords: Pain, Pain measurement, Parkinson's disease, Sensory disorders.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A dor na doença de Parkinson é uma queixa muito frequente, podendo preceder o diagnóstico da doença. O objetivo deste estudo foi avaliar a dor num grupo de pacientes com doença de Parkinson de um serviço de atendimento especializado.
MÉTODOS: Trata-se de um estudo observacional da dor em pacientes com doença de Parkinson no Hospital das Clínicas da Universidade Federal de Pernambuco. A amostra de conveniência, obtida entre julho e agosto de 2011, foi composta por 24 sujeitos, sendo 17 do gênero masculino e 7 do gênero feminino, com idades que variaram de 42 a 50 (média=64,3) anos e 48 a 66 (média=58,7) anos, respectivamente. Utilizou-se a sessão III da Escala Unificada de Avaliação da Doença de Parkinson, a classificação segundo o estágio da doença de Hoehn e Yahr (HY), o questionário de dor McGill e o Mini-Exame do Estado Mental.
RESULTADOS: A região específica do corpo com dor mais frequente foi coluna lombar (50%). As regiões categorizadas com maior percentual de queixas foram: tronco (66,7%) e membros (37,5% - superiores; 37,5% - inferiores). A maioria dos pacientes referiu dor em apenas uma região do corpo, independentemente de se analisar as regiões específicas ou categorizadas (37,5%). Não houve diferença significativa na pontuação proporcional atingida por cada componente da pontuação do questionário McGill. Pacientes com doença de Parkinson do grupo rígido-acinético apresentaram maior número de regiões do corpo com dor. A comparação entre as pontuações dos índices de McGill, segundo o sintoma predominante e segundo o estágio da doença de Parkinson (HY) não apresentou diferença significativa.
CONCLUSÃO: No presente estudo, todos os pacientes com doença de Parkinson referiram dor. Apesar da dor representar um dos sintomas não motores mais frequentes, muitos aspectos da dor relacionada à doença de Parkinson necessitam de investigação, tais como qual seria a melhor categorização da dor e que metodologia poderia distinguir melhor os diferentes mecanismos dos vários tipos de dor.
Descritores: Distúrbios sensoriais, Doença de Parkinson, Dor, Mensuração da dor.

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INTRODUCTION

Parkinson's disease (PD) is a progressive neurological disease affecting 1% of the population above 50 years of age. Classic PD motor symptoms include bradykinesia, rigidity, posture instability and tremor at rest. Among non-motor symptoms there are neuropsychiatric disorders, sleep disorders, autonomic dysfunctions and some sensory disorders[1,2].

Pain has been reported in PD since the first descriptions of the disease[1], and may precede or follow motor symptoms. Primary sensory disorders are described by 40 to 50% of PD patients and encompass numbness, tingling, burning, cold, heat and pain[2]. Most recurrent pain is pain in the limb affected for the longest time by motor PD symptoms[3], being referred by approximately 30 to 50% of patients[4].

Some pain scales are very well known: visual analog scale (VAS), visual numeric scale (VNS) and pain scale represented by facial expressions, which are unidimensional tools to quantify pain intensity and severity. On the other hand, multidimensional tools measure pain dimensions involving sensory-discriminative and affective-emotional aspects[5]. A very popular multidimensional tool to quantify pain is the McGill questionnaire[6].

Although being internationally referred and used in the clinical practice, McGill questionnaire has been poorly explored to study PD pain[3]. So, this study aimed at characterizing pain in PD patients assisted by a specialized outpatient service.

METHODS

This is an observational, analytical study developed by the Pro-Parkinson's Program, Clinicas Hospital, Federal University of Pernambuco, which is a reference in the State of Pernambuco for PD patients. Convenience sample, obtained between July and August 2011, was made up of individuals with clinical diagnosis of PD. The service has weekly periodicity allowing patients' recruitment once a week.

Sample was made up of 24 individuals, being 17 males and 7 females, aged between 42 and 50 (mean=64.3) years and 48 and 66 (mean=58.7) years, respectively.

During the study period, invited individuals of both genders, who reported pain and formally accepted to participate in the study after signing the Free and Informed Consent Term (FICT), were submitted to the Mini Mental State Examination (MMSE)[7] and presented satisfactory communicative and cognitive level for the study.

Patients with PD severity I, II, III or IV, according to the original version of Hoehn and Yahr scale[8], have answered the Brazilian version of the McGill pain questionnaire. These patients were also evaluated according to the predominant symptom. For such, Unified PD Rating Scale (UPDRS)[9] scores were considered as follows: questions 20 (tremor at rest) and 22 (rigidity) scores were compared; if question 20 had the highest score, the individual was included in the "trembling" group; if question 22 had the highest score, patient was included in the "rigid/akinetic" group; however, if both questions scores were equal or if the difference was only 1 point, patients were included in the "mixed" group.

After data distribution analysis, non parametric statistical tests were used. Friedman and Kendall tests were used to compare paired means of more than two groups. Fisher Exact test was used for frequency comparison and Mann-Whitney test was used to compare means between two groups. Statistical program was SPSS (version 17.0) for $p<0.05$.

This study was approved by the Ethics Committee for Research with Human Beings of the Health Sciences Center, Federal University of Pernambuco, n. 479/2011.

RESULTS

Table 1 shows the frequency of patients according to PD characteristics.

Table 1. Characteristics of patients with Parkinson's disease

Characteristics	Stages (HY)				Symptom*		
	I	II	III	IV	R	T	M
Number of patients	7	6	10	1	8	15	1
%	29.1	25.0	41.7	4.2	33.3	62.5	4.2

*predominant symptom; R: rigid-akinetic group; T: trembling group; M: mixed group; %: frequency.

Lumbar spine is the region with more pain complaints when specific body regions are analyzed. Observing categorized body regions, trunk has the highest percentage of complaints. Table 2 shows pain distribution among the 24 patients of the sample.

Table 2. Frequency of patients according to painful body regions

Regions	Number of patients	%
Specific regions		
Face	1	4.2
Neck (except cervical spine)	4	16.7
Chest	4	16.7
Cervical spine	2	8.3
Thoracic spine	4	16.7
Lumbar spine	12	50
Shoulder	6	25
Arm	6	25
Forearm	2	8.3
Hand	1	4.2
Lower limb root (groin, iliac crest)	3	12.5
Thigh	5	20.8
Knee	4	16.7
Leg	5	20.8
Foot	2	8.3
Categorized regions		
Head	1	4.2
Neck	5	20.8
Trunk	16	66.7
Upper limbs	9	37.5
Lower limbs	9	37.5

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Most patients have referred pain in a single body region, regardless of analyzing specific or categorized regions (Table 3).

Table 3. Frequency of patients according to the number of painful body regions

Number of regions	Number of patients	%
Specific regions		
1	9	37.5
2	6	25.0
3	4	16.7
4	3	12.5
5	1	4.2
15	1	4.2
Total	24	100
Categorized regions		
1	12	50
2	9	37.5
3	2	8.3
4	1	4.2
Total	24	100

Most frequent descriptor used by patients to characterize pain was nagging, followed by throbbing, acute and tiring (Table 4).

Table 4. Frequency of most common descriptors used by patients to qualify pain

Descriptors	Number of patients	%
Nagging	14	58.3
Throbbing	13	54.2
Acute	13	54.2
Tiring	13	54.2
Increasing	12	50.0
Strong	12	50.0
Tearing	12	50.0
Troublesome	11	45.8
Radiating	11	45.8
Fearful	10	41.7
Cramping	9	37.5
Burning	9	37.5
Aching	9	37.5
Exhausting	9	37.5
Debilitating	9	37.5

Pain experience described in McGill questionnaire sensory dimension was the most frequently referred by patients (Table 5). Friedman and Kendall tests have shown, strictly, that there has been no significant difference (p>0.05) in percentages (%) reached by each McGill score component, indicating no predominance among components.

Comparison among McGill scores, according to predominant symptom and according to PD stage (HY) has not shown significant difference (Mann-Whitney test, p>0.05).

The association of the number of painful body regions and predominant symptom shows a significant association, so that DP patients from the rigid-akinetic group have more painful body regions (Table 6).

Table 6. Association of painful body regions and predominant symptom in Parkinson's disease

Symptoms*	Number of painful regions in two categories n (%)	
	1 or 2	>2
Trembling	12 (80)	3 (20)
Rigid-akinetic	2 (25)	6 (75)

*predominant symptom; (Fisher Exact test, p=0.02); mixed type was removed from this table for presenting just one patient.

Descriptors distressing, horrible and excruciating were the most frequently used to characterize current pain intensity (CPI) being each descriptor referred by 20.8% of patients.

DISCUSSION

Pain is a common PD symptom and affects approximately 80% of patients, being very often more disabling than motor symptoms[10].

Pain has been more deeply studied in recent years as a PD symptom which substantially affects QL of at least one third of patients[11].

Considering our results, mean age of studied population and presence of pain, there has been no correlation, similarly to literature reports[12-14].

Fill et al.[4] have carried out a detailed literature review evaluating possible mechanisms, classifications and potential risk factors for PD pain, and have observed that age was not systematically considered in all studies and that correlation between different types of pain and age was not investigated in some studies.

With regard to gender, several studies state that there are no differences for the presence or not of pain[15,16]. However, Beiske et al.[12] have reported that the female gender was a significant predictor for PD pain.

Table 5. Descriptive statistics of McGill pain dimensions

Dimensions	Mean		Median		Standard deviation		Minimum		Maximum	
	Score	%*	Score	%	Score	%	Score	%	Score	%
Sensory	22.8	55.5	23.5	57.3	7.1	17.3	5	12.2	34	82.9
Affetive	5.5	40.6	5.5	39.3	3.4	24.8	1	7.1	14	100
Evaluative subjective	2.5	50.8	2.0	40.0	1.7	33.9	1	20	5	100
Miscellaneous	9.3	54.4	9.5	58.8	2.5	13.9	6	35.3	15	82.3
Total	39.8	51.6	40.0	51.9	10.8	14.4	13	16.9	59	76.6
CPI	2.8	56	3.0	60	1.8	36	0	0	5	100

*percentage means score value with regard to maximum score. CPI: current pain intensity

Martinez-Martin et al.[17] have studied 950 PD patients using the Non-Motor Symptoms Score, aiming at investigating gender differences in non-motor symptoms, including pain. Authors have found no differences in age, onset age, disease duration and motor incapacity between genders. However, with regard to pain, it has been more frequent among females. Study[18] has observed that pain complaints were described in the same sites for both genders. Females have reported higher prevalence of pain in cervical and lumbar regions[18]. Authors have documented differences in opioid analgesia, suggesting that endogenous inhibitory system for pain is less effective in females[19]. PD pain neurophysiology is still not well understood. The implication of the dopaminergic system in pain transmission is controversial. Dopamine probably has a role in central pain modulation, as suggested by animal studies[20].

Zambito Marsala et al.[21], using electric stimulation, have observed that pain tolerance threshold is lower in PD patients as compared to healthy individuals. Mechanisms involving nociceptive stimulations for basal ganglia are discussed[22]. Basal nuclei are also connected to several pain-related areas, and black matter efferent pathways establish connections with areas involving the affective-motivational part of pain[23]. Neuroimaging studies with humans have shown that pain modulation involves dopamine D2 receptors[24]. All these findings suggest that in PD patients, the abnormal function of basal nuclei directly modulates pain by increasing or decreasing nociceptive signal propagation and indirectly by the affective and cognitive influence interfering with how patients experience and interpret nociceptive signals and pain[25].

Na autopsy study[26] with six individuals using immunocytochemistry has described the first pain retransmission pathways and the involvement of parasympathetic and pre and post-ganglionic sympathetic neurons and has found degenerative changes in layer 1 of spinal cord dorsal horn.

The vast majority of patients in this study were in HY stage III and in the trembling group; however they were not correlated to the pain symptom. Similarly, the HY scale was not correlated to pain, probably because the vast majority of patients were in stages 2 and 2.5, representing minimally disabling stages[3].

Pain location in the 24 patients indicates as specific area with more frequent pain complaints the lumbar spine, followed by shoulder and arm. In the same table, in the categorized body regions analysis, it is also observed that the trunk had the highest number of complaints, in addition to upper and lower limbs.

PD patients have two different types of pain: nociceptive and neuropathic. Nociceptive pain is extremely frequent (40-90%)[27] and is typically musculoskeletal and visceral. Musculoskeletal pain is in general caused by abnormal posture, rigidity and akinesia causing motor fluctuations.

Studies regarding PD pain characteristics and prevalence are still conflicting. A systematic literature review has shown that pain is more frequently located in lower limbs, with almost half of all PD patients complaining of musculoskeletal pain (46.4%)[28].

CONCLUSION

In our study, all PD patients have referred pain. Although pain being one of the most frequent non-motor symptoms, several aspects of PD-related pain need investigation, such as which would be the best pain categorization and which methodology could better distinguish mechanisms of different types of pain.

ACKNOWLEDGMENTS

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